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where the surface overwash has hidden the character of the substratum. The forest on the loess is dominated by *Quercus alba* and *Q. ruba*, while the adjacent sandy areas are covered by the more xerophytic *Q. velutina* and *Q. macrocarpa*.—GEO. D. FULLER.

Air chambers of Ricciaceae.—Miss HIRSH,³¹ under the direction of Dr. E. J. DURAND, has examined a number of species of *Riccia* to determine the correctness of the statement of BARNES and LAND that the air chambers of Marchantiales arise invariably by the splitting of internal walls. She finds that in the Ricciaceae the statement is true only for *Riccia natans* and *Riccia fluitans*, and that in all other species which she examined the air chambers arise according to the method described by LEITGEB, and cites as proof three figures of *Riccia Frostii*. To critical students of the group these figures do not furnish conclusive evidence one way or the other, for they are made in such a manner that the relation to each other of the rows of the cells back of the growing point cannot be made out with any certainty. In fig. 4 of *Riccia Frostii* the first air chambers can as easily be interpreted as having split from within the thallus and having just reached the surface, as that the cells have become papillate. In fact, the contour of the section drawn seems to show that all the filaments actually originated by splitting and intercalary growth. The same is true in a more marked degree of fig. 5, and less so of fig. 6. In the latter figure the arching of the superficial cells due to turgor is interpreted by Miss HIRSH as the beginning of the papillate outgrowths of LEITGEB. Such investigations should be preceded by a careful study of the development of the thallus from the growing point, and there should be a clear conception of the arrangement of the cells which result from this growing point. While the style of the drawings is admirable, the position of cells and cell walls shows that such study must have been neglected in this case.—W. J. G. LAND.

Light and germination.—KINZEL³² has devised apparatus that answers all objections to his former methods, which indicated that light favored or was even necessary for the germination of various seeds. Both illuminated and darkened after-ripened seeds of *Veronica Anagallis* were kept in germinators at a constant temperature of 16°7 C. Within a week 100 per cent of the illuminated cultures had germinated, while none of the darkened ones grew even after three months. He lists 63 species that germinate only in light, of which the following are examples: *Scheuchzeria palustris*, *Luzula albidula*, *Thalictrum angustifolium*, *T. aquilegifolium*, *Drosera rotundifolia*, *D. anglica*, *D. intermedia*, *Primula pubescens*, *P. spectabilis*, *Verbascum Thapsus*, *V. nigrum*, *Mimulus luteus*, *Veronica Anagallis*, and *Campanula rotundifolia*. He does not state whether high temperatures will dispose of the necessity of light, as is the case with various fern spores. It also

³¹ HIRSH, PAULINE E., The development of air chambers in the Ricciaceae. Bull. Torr. Bot. Club 37:73-77. figs. 6. 1910.

³² KINZEL, W., Lichtkeimung: Erläuterungen und Ergänzungen. Ber. Deutsch. Bot. Gesell. 27:536-545. pl. 19. 1909.